

## **Distribution and frequency of ABO blood groups and Rhesus (RH) factors in MGM Blood bank**

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### **Abstract**

**Objective:** To determine the distribution frequency of ABO blood group and Rhesus (Rh) factor in the MGM Blood bank, Aurangabad, Maharashtra, India.

**Methods:** A retrospective study of distribution and frequency of ABO blood groups and rhesus (Rh) factor was carried out at blood bank MGM Medical college Aurangabad. Blood group determination of voluntary blood donors was done. Total 25140 donors were considered medically fit and donated blood during study period, from January 2001 to June 2014. Blood grouping ABO and Rh was done by antigen-antibody agglutination test by commercially available standard antiseras.

**Results:** Total 25140 donors included in study out of which 23713 were male and 1427 were female . Maximum donation was recorded in age group of 21-30 years. Group wise precentage was group A (25.39%) ; group B (32.45% ); groupAB ( 9.01%) and group O (33.15%) . Rh positive donor 95.44% and Rh negative were 4.56%.

**Conclusion:** Maximum number of donors are in a age group of 21 to 30 years. Male donors are more than female donors blood donation by the females was very low and it need to be increased by improving health status and awareness about blood donation.” O” blood group is commonest among all group. Regarding Rhesus blood group system Rh positive group is common. It is necessary to conduct similar well designed studies in other states of India in order to determine the blood group frequencies in them.

**Keywords:** ABO blood group, Rh factor, Antiseras, Blood bank.

### **1. Introduction**

People have different blood types, known as blood groups. Antigens are hereditary determined and plays a vital role in transfusion safety.

Knowledge of the distribution of ABO and Rh blood groups is essential for effective management of blood banks inventory. Blood group is genetically predisposed. Until now 400 blood groups are reported but the most important in them are ABO and Rh.<sup>1</sup> In transfusion, the most important blood groups are also ABO and Rh blood group system.<sup>2</sup> ABO is the human blood group and it depends on presence of A or B genes.<sup>3</sup> "ABO blood-group antigens are oligosaccharides attached to cell surface glycoconjugates expressed by epithelia, endothelia and erythrocytes (RBCs) in primates".<sup>4</sup> The distribution of ABO and Rh blood groups vary from one race to another race; across the world in the population and within human subpopulations. Differences are present even in India due to racial differences. Blood group prevalence plays a role in evolution, genetics research, blood transfusion and organ transplantation. Modern medicine is also working on relationship of blood group with environment. The aim of the present study was to determine the distribution frequency of ABO blood group and Rhesus (Rh) factor in the MGM Blood bank, Aurangabad, Maharashtra, India. Another purpose was to generate data for multipurpose future utilities.

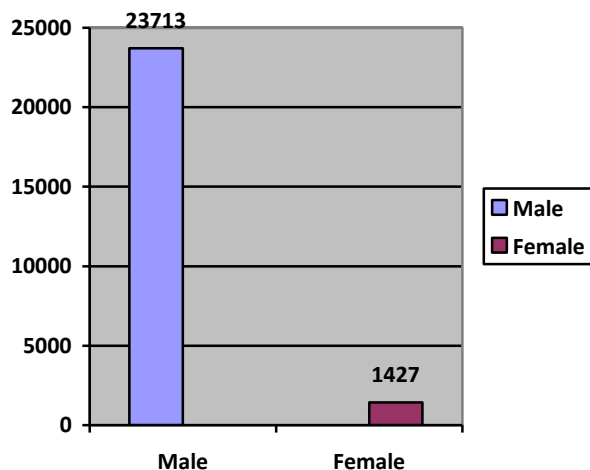
## 2. Material and Methods:

A retrospective study of distribution and frequency of ABO blood groups and rhesus (Rh)

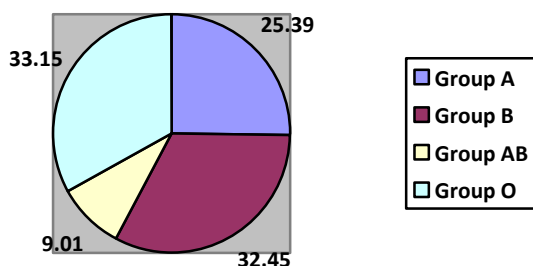
factor was carried out at Blood Bank MGM Medical College Aurangabad. Blood group determination of voluntary blood donors was done. Total 25140 donors were considered medically fit and donated blood during study period, from January 2001 to June 2014. Blood grouping ABO and Rh was done by antigen-antibody agglutination test by commercially available standard antisera. The blood samples were transferred into laboratory analyzed for the anti-A, anti-B, and anti-D monoclonal antiserum were used for blood group by slide method that placed on a clean white tile in three places. A drop of each of the antisera, anti A, anti B, anti D was mixed with each drop of blood. Blood groups were determined on the basis of agglutination. If agglutination is occurred that means it is positive, and if not it is a negative.

## 3. Results:

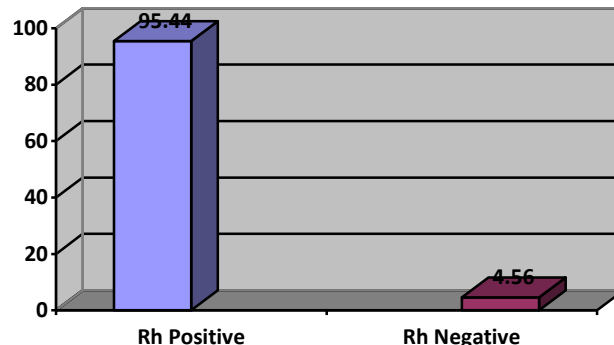
Total 25140 donors included in study out of which 23713 were male and 1427 were female . Maximum donation was recorded in age group of 21-30 years. Group wise percentage was group A (25.39%) ; group B (32.45% ); group AB ( 9.01%) and group O (33.15%) . Rh positive donor 95.44% and Rh negative were 4.56%.



**Fig. 1. Distribution according to gender**



**Fig. 2. Distribution according to ABO blood group.**



**Fig.3. Distribution according to Rh Factor**

#### 4. Discussion:

The need for blood group prevalence study is not only important for transfusion medicine but also for organ transplantation and genetic research. Knowledge of frequency of ABO Blood Groups are an important tool to determine the direction of recruitment of voluntary donors as required for each zone across the country. It has been observed that percentage of blood group distribution in different parts of the world is different depending upon the ethnic origin of the races.<sup>5</sup> In our study the group O was the commonest blood group, this was similar to South African Indians, Australian aborigines and in Europeans (group A was in higher frequency), while it was dissimilar to Africans in which B group was much commoner.<sup>6</sup> The results of our study were similar to many other studies likes in the United States of America, 46% constitute group O, 41% A, 9% B and 4% AB, also a study in IRAN show O group is commonest (41.16%)

blood group<sup>7,8</sup> While the present study showed the different trend of ABO distributions as seen in our previous study<sup>9</sup> in the general central Indian populations ( $B \geq O > A > AB$ ). The blood group frequency in males and females are similar in entire population group, because blood groups are autosomal, thus frequencies are not different in the two sexes. In our study nearly 4.56% students was Rhesus negative compare to 17% in UK.<sup>9</sup> The distribution of Rhesus positive group in present study was 95.44%; while its frequency in the English population is 95%. In US, 85% belong to Rh +ve group; while in Saudi Arabia 93% are found to be Rh +ve. In Iran 90% are found to be Rh +ve. The frequency of Rh +ve was 95.44% and Rh -ve was 4.56% in present study; this distribution was different among general population as in our previous study<sup>10</sup>, in which 97.52% Rh +ve and only 2.47% subjects have Rh -ve blood group. While looking at Rh grouping, 89-95 % donors all over the world are detected as Rh+ve except at Britain and U.S.A. where the frequency of Rh positivity is 83– 85%. Significant implications of present study is provides information regarding safe transfusion, apart from transfusion service, knowledge of the blood group system helps to take preventive measures against the diseases which are associated with different blood groups, as well as resolving certain medico-legal issues, particularly of disputed paternity cases. Blood group O is a risk factor for duodenal ulcer.<sup>11</sup> individuals have O' group reduced 14 % risk of

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squamous cell carcinoma and 4 % risk of basal cell carcinoma compared to non-O group.<sup>11</sup> It is also associated with a reduced risk of pancreatic cancer.<sup>12,13</sup> Blood group B has highest frequency of Diabetes Type II, since diabetes is common in our population, persons with blood group B who are at high risk should have screening for diabetes earlier than normal population.<sup>14</sup> The 'B' antigen links with increased risk of ovarian cancer.<sup>15</sup> Coronary artery disease (CAD) is also very common here but risk of CAD is same in all blood groups.<sup>16</sup> persons having group A are affected more frequently with coronary heart disease, ischemic heart disease, venous thrombosis and atherosclerosis, while its low in people with blood group 'O' which stated to have protective effect against these diseases. Gastric cancer has reported to be more common in blood group 'A' and least in group 'O'.<sup>17</sup>

## 5. Conclusion:

The present study concludes that 'O' group is the commonest blood groups. The present study provides information regarding safe transfusion; apart from transfusion service knowledge of the blood group system helps to take preventive measures against the diseases which are associated with different blood groups, to prevent the dangerous transfusion reactions and efficient.

management, as well as resolving certain medico-legal issues, particularly of disputed paternity cases. Groups of individual indicated on national identity cards, driving licenses and School/office identity cards will be of tremendous use in case

of acute hemorrhage or anemia in children when urgent transfusion is required.

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